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PREVENTION OF RANCIDITY IN FARM BUTTER

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Rancidity is the most common form of spoilage of farm butter. It is characterized by objectionable flavor and odor, generally called "rancid" or "strong," sometimes "bitter" or "wintry." It is caused by chemical breakdown of the fat; the degree of breakdown influences somewhat the term used by persons tasting the butter. Rancid butter is not unwholesome, but in advanced stages is exceedingly unpalatable. In farm butter the defect is generally of one of two types--spontaneous rancidity, which develops within a very few days after the butter is made; and mold rancidity, which, if it occurs, generally does not appear until the butter is 2 or 3 weeks old.

SPONTANEOUS RANCIDITY

Spontaneous rancidity is reported mainly from farms where the milk of only one or two cows is used for buttermaking. It is most common during the winter, when cows are fed principally on dry feed. The milk of cows late in their lactation period (that is, cows which have been milking a long time) often develops spontaneous rancidity. When the cream, under these conditions, is churned, the buttermilk frequently tastes bitter; and the butter becomes "strong" in flavor after 2 or 3 days. Indeed, such cream churns only with difficulty and sometimes not at all.

Spontaneous rancidity of butter is caused by the enzyme lipase, secreted in the milk. When persons encounter this difficulty the natural questions to ask are whether the milk and butter are safe to use and whether the cow is healthy. The answer to both of these questions is "yes": the milk is wholesome; and the cow is healthy, at least so far as relates to rancidity. No concern need be given to the question of health. The problem is rather one of palatability and of preventing the trouble. Several different ways of overcoming or reducing this type of rancidity are discussed below. One of these may be sufficient, or a combination may be necessary.

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Washing the Butter

The tendency to rancidity and other types of spoilage may be greatly reduced by washing the butter several times with clean, cold water. This should always be done.

Mixing the Milk

As Tarassuk and Henderson[3] have shown, rancidity does not develop where the milk containing the lipase is mixed with milk that does not contain it. Mixing should be in the proportion of one part of the former to four parts or more of the latter, and should be done within an hour after milking and before cooling, or at least immediately after cooling. The effect of mixing explains why spontaneous rancidity is more common when the milk from only one or two cows is used. If possible, the milk from cows that have been milking a long time--8 or 9 months--should be mixed with milk from cows recently freshened.

Effect of Feed

Spontaneous rancidity in butter is most frequently reported in the winter, when only dry feed is available. Often a cow is kept confined and given dry hay when, with a little effort, green pasture could be used. Although green feed will not always overcome the difficulty, it will do so in many cases; and always it will reduce the intensity of rancid flavor. Every effort should therefore be made to provide green feed, either pasture or freshly cut grass.

Effect of Late Lactation

Cows that have been milking 9 months or more may give slightly bitter or salty milk, the butter from which will develop spontaneous rancidity. When late lactation is the obvious cause of the trouble, the solution is to put the cow dry. When she freshens again, the butter made from her milk will probably be all right.

[3] Tarassuk, N. P., and J. L. Henderson. Prevention of hydrolytic rancidity in milk. Journal of Dairy Science 25:801. 1942.

Pasteurization

Sometimes it is impossible to apply any of the remedies suggested above--namely, mixing the milk, supplying green feed, or putting the cow dry. Or perhaps the remedies available will not overcome the difficulty. The solution then is to pasteurize the milk or cream. This, if properly done, prevents the development of spontaneous rancidity; and it is the only sure method. Since, however, pasteurization is bothersome, people will usually not take the trouble with small lots of milk or cream until they have tried all other methods. Pasteurization is valuable also in destroying other agents, such as bacteria, that may exist in milk and that would cause butter to spoil. Greatly superior butter can be made from pasteurized milk or cream; this method is used almost universally in commercial buttermaking.

Either the milk before separation, or the cream, may be pasteurized. Treating the cream is preferable where a small hand separator is used. The cream from the night milking can be held over and mixed with that from the morning milking, and all pasteurized together each day. Cream that is to be pasteurized should not be kept longer than 18 hours after the milk is drawn from the cow. If the milk must be set for the cream to rise, one should pasteurize the milk immediately after drawing it and before cooling.

Nelson[4] describes a procedure for pasteurizing small quantities of milk or cream. A large pan or kettle of water is so arranged that the water can circulate around and under a smaller vessel containing the milk or cream. Cream should be heated to 150°F and held for 30 minutes, then promptly cooled. Milk may be pasteurized at 150° for 30 minutes and then cooled; or it may be brought to 175° and cooled immediately. Cream will rise more completely from milk heated to 175° flash than from milk heated to 150° for 30 minutes.

[4] Nelson, D. H. Home buttermaking. California Agr. Ext. Cir. 68:1-16. 1942.

MOLD RANCIDITY

Rancidity caused by mold contamination usually does not become noticeable until butter is 2 or 3 weeks old. As a rule, farm butter is eaten before that long, so that moldiness is not a problem. Sometimes, however, more butter is made than will be used at once, and the surplus must be stored till a later time. Unless precautions are taken, this stored butter will mold and spoil.

Refrigeration

Commercially, butter is kept at -10° to -20°F; but such refrigeration is not available on many farms. Butter for home use can be stored in salt brine without refrigeration.

Butter in Salt Brine

Nelson also gives directions for preparing a suitable salt brine. A stone jar or wooden keg may be used; it must be clean and scalded immediately beforehand. Boil for 15 minutes enough water to cover the butter, and dissolve in it 2-1/2 pounds of table salt per gallon of water. If no scales are at hand, have the brine strong enough to float a fresh egg. Wrap the butter securely in parchment or "butter" paper, and place it in the brine. Since butter will float if left to itself, lay a plate on top of it, and put a weight on the plate to keep the butter submerged. Good butter may be kept in this way for several months.

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